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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,370	01/23/2002	Bhavin S. Khatri	GB 010012	7620

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EXAMINER

LE, LANA N

ART UNIT	PAPER NUMBER
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2685

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/055,370

Applicant(s)

KHATRI, BHAVIN S.

Examiner

Lana N Le

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11 and 12 is/are rejected.
- 7) ☒ Claim(s) 9, 10 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-6, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz (WO 98/36596) in view of Shoki et al (US 6,087,986) and further in view of Gladh (US 5,959,579).

Regarding claim 1, Katz discloses a radio communication system (system comprising a first station and a second station) having a communication channel (page 10, lines 38-40) comprising a plurality of paths between first and second terminals (first and a second stations) each having a plurality of antennas (antenna array; fig. 2),

the method comprising wherein the first terminal (first station) determining a plurality of directions via determining means (8) from which signals arrive from the second terminal (2<sup>nd</sup> station) (page 12, line 35 – page 13, line 24), receiving signals at a1-a8 to outputs (14a-h) from some or all of the plurality of directions.

Katz fails to further disclose:

means for extracting a plurality of sub-streams from the received signals and  
means for combining the plurality of sub-streams to provide an output data stream.

However, extracting the original substreams in a particular frequency transmitted by the

desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: means (29-32; fig. 3 and hereafter) for extracting a plurality of sub-streams from the received signals and means (33) for combining the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for extracting and means for combining the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose:

the transmitter having means for separating a signal for transmission into a plurality of sub-streams. Gladh discloses a transmitter having means (50) for separating a signal for transmission into a plurality of sub-streams (col 1, lines 34-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for separating a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

Regarding claim 2, Katz, Shoki et al and Gladh disclose the system of claim 1 wherein Katz further disclose the system is characterized in that the receiving means further comprises means for determining an angular power distribution of incoming signals (page 22, lines 16-20).

Regarding claim 3, Katz, Shoki et al and Gladh disclose the system of claim 2,

wherein Katz further disclose a system as claimed in claim 2, characterised in that the direction determining means further comprises means for selecting as the plurality of directions those directions from which the strongest signals arrive from the second terminal (page 3, line 37 – page 4, line 17).

Regarding claim 5, Katz and Gladh disclose the terminal of claim 4, wherein Katz discloses the terminal is characterized in that the receiving means further comprises means for receiving a plurality of respective signals from some or all of the plurality of directions.

Katz and Gladh do not disclose:

means for extracting a plurality of sub-streams from the received signals and,  
means for combining the plurality of sub-streams to provide an output data stream.

However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al.

Shoki et al disclose: means (29-32; fig. 3 and hereafter) for extracting a plurality of sub-streams from the received signals and means (33) for combining the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for extracting and means for combining the plurality of substreams in the terminal of Katz and Gladh in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Regarding claim 6, Katz, Gladh and Shoki et al disclose the terminal as claimed in claim 5, wherein it is well known in the art that the number of transmitted and received sub-streams are not equal. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have unequal transmit and receive substreams in order to allow the number of transmitted and received substreams be transmitted and received from different directions at random.

Regarding claim 12, Katz discloses a method of operating a radio communication system (system comprising a first station and a second station) having a communication channel (page 10, lines 38-40) comprising a plurality of paths between first and second terminals (first and a second stations) each having a plurality of antennas (antenna array; fig. 2),

the method comprising the first terminal (first station) determining a plurality of directions via determining means (8) from which signals arrive from the second terminal (2<sup>nd</sup> station) (page 12, line 35 – page 13, line 24), receiving signals (at a1-a8 to outputs 14a-h) from some or all of the plurality of directions.

Katz fails to further disclose:

extracting a plurality of sub-streams from the received signals and combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: extracting via (29-32; fig. 3 and hereafter) a plurality of sub-streams from the received signals and;

combining (via 33) the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to extract and combine the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose:

the first terminal separating a signal for transmission into a plurality of sub-streams and transmitting each substream into a respective one of the plurality of determined directions. Gladh discloses a transmitter having means (50) for separating a signal for transmission into a plurality of sub-streams and transmitting each substream into a respective one of the plurality of determined directions (col 1, lines 34-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

Regarding claim 13, Katz discloses a method of operating a radio communication system (system comprising a first station and a second station) having a communication channel comprising a plurality of paths between first and second terminals (first and a second stations) each having a plurality of antennas (antenna array; fig. 2) wherein the first terminal (first station) comprises receiving means (a1-a8) having direction determining means (8) for determining a plurality of directions from which signals arrive

from the second terminal (page 12, line 35 – page 13, line 24), receiving signals via (a1-a8) on outputs (14a-h) from some or all of the plurality of directions (page 12, line 35 – page 13, line 24);

and transmitting each substream into a respective one of the plurality of determined directions (page 3, line 37 – page 4, line 17).

Katz fails to further disclose:

extracting a plurality of sub-streams from the received signals and combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: extracting (via 29-32; fig. 3 and hereafter) a plurality of sub-streams from the received signals and combining (via 33) the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to extract and combine the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

Katz and Shoki et al fail to further disclose:

the method further comprising the first terminal separating a signal for transmission into a plurality of sub-streams. Gladh discloses the method further comprising the first terminal (1<sup>st</sup> station) for separating a signal (via 50) for transmission into a plurality of sub-streams (col 1, lines 34-58).



It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

3. Claims 4 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz (WO 98/36596) in view of Gladh (US 5,959,579).

Regarding claim 4, Katz discloses a terminal (BTS) for use in a radio communication system (page 11, lines 9-17) comprising a plurality of paths between the terminal (first station) and another terminal (second station)

wherein receiving means (a1-a8) are provided having direction determining means (8) for determining a plurality of directions from which signals arrive from the other terminal (page 12, line 35 – page 13, line 24),

and transmitting means for transmitting each substream into a respective one of the plurality of directions determined by the receiving means (page 3, line 37 – page 4, line 17).

Katz doesn't disclose:

the transmitting means having means for separating a signal for transmission into a plurality of sub-streams. Gladh discloses transmitting means are provided having means 50 for separating a signal for transmission into a plurality of sub-streams (col 1, lines 34-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for separating a signal for transmission into a plurality of substreams in order to divide the signal into sub components to allow the antenna elements of the array antenna of Katz and Shoki et al to transmit the multistream signals and to reduce interference to adjacent antenna arrays of other transceivers.

Regarding claim 7, Katz and Gladh disclose a terminal as claimed in claim 4, wherein Katz further discloses the terminal is characterized in that the receiving means further comprises means for determining an angular power distribution of incoming signals (page 22, lines 16-20).

Regarding claim 8, Katz and Gladh disclose the terminal as claimed in claim 7, wherein Katz disclose the terminal is characterized in that the direction determining means further comprises means for selecting as the plurality of directions those directions from which the strongest signals arrive from the second terminal (page 3, line 37 – page 4, line 17).

4. Claim 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz (WO 98/36596) in view of Shoki et al (US 6,087,986).

Regarding claim 11, Katz discloses a terminal (BTS) for use in a radio communication system (page 11, lines 9-17) having a communication channel (page 10, lines 38-40) comprising a plurality of paths between the terminal (first station) and another terminal (second station),

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wherein receiving means (a1-a8) are provided having direction determining means (8) for determining a plurality of directions from which signals arrive from the other terminal (page 12, line 35 – page 13, line 24);

means (a1-a8) for receiving a plurality of respective signals from some or all of the plurality of directions (page 12, line 35 – page 13, line 24).

Katz fails to further disclose:

means for extracting a plurality of sub-streams from the received signals and means for combining the plurality of sub-streams to provide an output data stream. However, extracting the original substreams in a particular frequency transmitted by the desired transmitter from the received signals and combining them is well known in the art as taught by Shoki et al. Shoki et al disclose: means (29-32; fig. 3 and hereafter) for extracting a plurality of sub-streams from the received signals and means (33) for combining the plurality of sub-streams to provide an output data stream (col 5, lines 28-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have means for extracting and means for combining the plurality of substreams in order to suppress unnecessary interference waves and combine them to lessen fading fluctuation from the interference waves.

***Allowable Subject Matter***

5. Claims 9-10 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 9, Katz and Gladh disclose a terminal as claimed in claim 4, wherein Katz and the cited prior art fail to disclose the terminal is characterised in that the transmitting means includes control means for operating the plurality of antennas as an array and operable to adapt the antenna pattern for each substream such that a peak in the antenna pattern corresponds to the respective direction and nulls in the antenna pattern correspond to the directions in which other sub-streams are transmitted.

Regarding claim 10, Katz and Gladh disclose a terminal as claimed in claims 4, wherein Katz and the cited prior art fail to disclose the terminal is characterised in that the transmitting means includes control means for independently adjusting the power and/or bitrate of each sub-stream depending on a signal quality parameter of the sub-stream.

Regarding claim 13, Katz and Gladh disclose a method as claimed in claim 12, wherein Katz and the cited prior art fail to disclose the method is characterized by independently adjusting the power and/or bitrate of each sub-stream depending on a signal quality parameter of the sub-stream.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N Le whose telephone number is (703) 308-5836. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lana Le

November 21, 2004